

EXHIBIT D

EXHIBIT D**Specialized Routing Solution For
Operator and DA Calls**

| CALL TYPE | 5ESS | DMS-100 | EWSD | 1AESS | DMS-10 |
|-------------------|--|--|--|--|--|
| 0- | AIN | AIN | AIN | SRN | SRN |
| 0+ local | LCC (cocot coin) SRN (non-coin) | LCC (cocot coin) SRN (non-coin) | LCC (cocot coin) SRN (non-coin) | LCC (cocot coin) SRN (non-coin) | LCC (cocot coin) SRN (non-coin) |
| 0+ IntraLATA toll | LCC (coin) SRN/2PIC ¹ (non-coin) | LCC (coin) SRN/2PIC ¹ (non-coin) | LCC (coin) SRN/2PIC ¹ (non-coin) | LCC (coin) SRN/2PIC ¹ (non-coin) | LCC (coin) SRN/2PIC ¹ (non-coin) |
| 411 | AIN | AIN | AIN | AIN | SRN |
| 555-1212 | AIN | AIN | AIN | AIN | SRN |

¹After 2 PIC implementation, these calls will be routed to the IntraLATA toll provider.

Definitions:

1. AIN = Advanced Intelligent Network
2. SRN = Specialized Routing Node
3. LCC = Line Class Code

EXHIBIT E

EXHIBIT E**AIN EXCEPTION LIST**

| Lucent 5ESS | Nortel DMS100 | Siemens EWSD |
|--------------------------------------|--|----------------------------|
| ISATND – # ISDN Attendant Lines | NISDN – BRI, Including EKTS | Two-Party Lines |
| DID – Lines without Office Equipment | MDC Attendant Consoles Data Units | Denied Origination Service |
| CustoPak Lines | MBS Data Units, Customized ISDN Lines, and functional signaling Meridian feature transparency (MFT) set. (P-phones) | Remote Call Forwarding |
| Customized ISDN Lines | Datapath lines | |
| | WATS lines | |

OTHER AIN-BASED SERVICE EXEPTIONS

1. CENTREX ARS
2. Easy Voice
3. Work At Home Billing Service
4. CENTREX Extend
5. Switch Redirect Service (requires special handling)

EXHIBIT F

June 13, 1997

Ⓐ Bell Atlantic

EXHIBIT F

TR 72580
Issue 1, January 1997

Bell Atlantic Technical Reference

**Analog Unbundled Port Services
Technical Specifications**

© 1997 Bell Atlantic Network Services, Inc.
All Rights Reserved
Printed in U.S.A.

**Bell Atlantic Network Services, Inc.
Technical Reference**

**TR 72580
Issue 1, January 1997**

Notice

This Technical Reference is published by Bell Atlantic to provide a technical description of Analog Unbundled Port Services. To the extent feasible, the description references or duplicates existing published technical references utilized by the industry.

Bell Atlantic reserves the right to revise this technical reference for any reason including, but not limited to, changes in tariffs, laws, or regulations, conformity with updates and changes in standards promulgated by various agencies, utilization of advances in the state of technical arts, or the reflection of changes in the design of any facilities, equipment, techniques, or procedures described or referred to herein. Liability for difficulties arising from technical limitations or changes herein is disclaimed.

Bell Atlantic reserves the right not to offer any or all of these services and to withdraw any or all of them at any future time. In addition, the services described herein are based on available facilities and equipment and may not be universally available.

With respect to services offered pursuant to tariff, however, the terms and conditions of the service offering are determined by the tariff itself and applicable laws and regulations. This reference is intended to be supplemental to the tariffs. In the event of a conflict between the tariffs, laws or regulations and this reference, the tariffs, laws, and regulations shall govern.

For additional copies, please contact:

Bell Atlantic Document and Information Delivery Services
1310 N. Court House Road
Arlington, VA 22201
703-974-5887

For information about the technical specifications in this TR, contact:

Trone Bishop
1 East Pratt St.
Baltimore, Md. 21202
410-736-7622

EXHIBIT F

Bell Atlantic Network Services, Inc.
Technical Reference

TR 72580
Issue 1, January 1997

Bell Atlantic Technical Reference
Analog Unbundled Port Services
Technical Specifications

| Contents | Page |
|---|-------------|
| 1. General | 1 |
| 2. Service Description | 1 |
| 3. Service Elements | 6 |
| A. General | 6 |
| B. CODF Wiring and Tie Cable(s) | 6 |
| C. Bell Atlantic Local Switching System CO Cabling | 6 |
| D. Local Switching System Analog Ports | 7 |
| 4. Service Specifications | 7 |
| 5. OTC Equipment and CO Cabling Requirements | 8 |
| A. OTC Equipment Requirements | 8 |
| B. OTC CO Cabling Requirements | 9 |
| 6. References | 10 |
| A. Definitions | 10 |
| B. Acronyms | 12 |
| 7. Bibliography | 13 |

| Figures | Page |
|--|-------------|
| Figure 2-1: Typical Analog Unbundled Port Configuration | 2 |
| Figure 2-2: Unbundled Port Service Elements | 3 |
| Figure 2-3: Requirements Associated with Analog Unbundled Port Services | 4 |
| Figure 2-4: UPS NC Codes | 5 |
| Figure 2-5: UPS NCI Codes | 5 |
| Figure 2-6: Valid Analog UPS NC/NCI Code Combinations | 5 |
| Figure 4-1: Analog UPS Acceptance Limits (AL) and Immediate Action Limits (IAL) | 7 |
| Figure 4-2: Compatible TLP Ranges at the OTC-POT | 8 |
| Figure 4-3: Compatible TLP Ranges at the BA Local Switching System | 8 |

1. General

1.01 This technical reference provides the technical specifications associated with the Analog Unbundled Port Services offered by Bell Atlantic in the co-carrier section of some local exchange tariffs.

1.02 Whenever this technical reference is reissued, the reason(s) for reissue will be provided in this paragraph.

1.03 Analog Unbundled Port Services (UPS) enable Other Telephone Companies (OTC) that are collocated in a Bell Atlantic (BA) Central Office (CO) to connect to analog switch ports on BA local switching systems. The analog switch ports provide access to the functionality of the switch including supervisory signaling, digit reception and transmission, routing, rating, usage, as well as other line or trunk features.

1.04 The technical specifications in this document assume that the OTC is collocated in the same CO as the analog UPS. In the future, BA may offer transport services for analog UPS. In that case, the technical specifications associated with the transport service will supersede those in this document where applicable.

2. Service Description

2.01 The service description, terms and conditions, prices, and Universal Service Order Codes (USOCs) for analog UPS are contained in applicable tariffs or contracts.

2.02 Analog UPS are provided subject to availability on a first-come first-served basis. Special construction charges apply when appropriate facilities are not available.

2.03 Analog UPS vary according to the type of switch port (interface) and the services desired. This document contains the technical specifications associated with the analog switch port. The services associated with the analog switch port are described in applicable tariffs and other technical references.

2.04 Analog ports provide a local switch interface that is suitable for the transmission of analog voice grade signals between approximately 300 and 3000 Hz. Analog ports use various methods of dc supervisory signaling to control call processing.

2.05 The following analog UPS are offered: Basic, Centrex, PBX, and Direct Inward Dialing (DID). The Basic, Centrex, and PBX ports are on the line side of the local switching system and use Loop-Start or Ground-Start signaling. The DID port is on the trunk side of the local switching system and uses Loop Reverse-Battery signaling.

2.06 Basic, Centrex, PBX, and DID ports consist of a 2-wire analog interface associated with a local switching system and a 2-wire CODF cross-connect between a 2-wire OTC CODF

termination and the CODF termination of the analog port. At each 2-wire interface one conductor is called tip and the other conductor is called ring. A typical analog port configuration is shown in Figure 2-1.

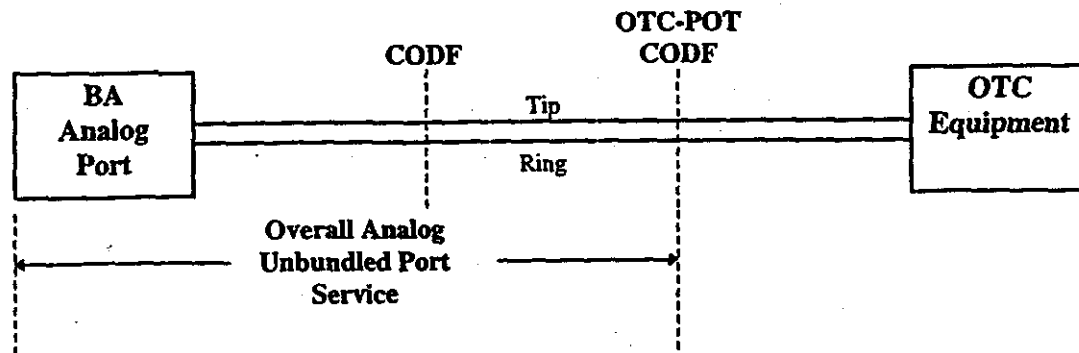


Figure 2-1. Typical Analog Unbundled Port Configuration

2.07 An analog UPS ordinarily consists of the following elements (see Figure 2-2):

- (1) Central Office Distributing Frame (CODF) wire and tie cable(s) between the CODF termination of the OTC equipment and the CODF termination of the BA analog switch port;
- (2) CO cabling between the CODF and the BA analog switch port; and,
- (3) an analog switch port on a BA local switching system that is either;
 - (a) a loop-start line-side port (LSLS);
 - (b) a ground-start line-side port (GSLS); or,
 - (c) a loop reverse-battery trunk-side port (LRTS). The LRTS port is either;
 - (I) an LRTS port on the trunk-side of a local switching system; or,
 - (II) an LRTS port on a digital channel bank in the same building that has a high capacity connection (such as DS1) to the local switching system.
- (4) Each LSLS or GSLS port has the following basic characteristics and capabilities:
 - (a) an associated telephone number;
 - (b) Dial Pulse (DP) or Dual Tone Multi-Frequency (DTMF) address signaling;
 - (c) access to local calling within the minimum BA-defined local calling area for each rate center;
 - (d) basic intercept;
 - (e) one primary directory listing;
 - (f) PIC1 and PIC2 access;

- (g) access to 911;
- (h) access to call routing, switch usage, and recording capability.

(5) Each LRTS port has the following basic characteristics and capabilities:

- (a) one way call routing from the BA local switching system to the OTC for associated telephone numbers;
- (b) DP, DTMF, or MF address signaling;
- (c) access to call routing and switch usage capabilities.

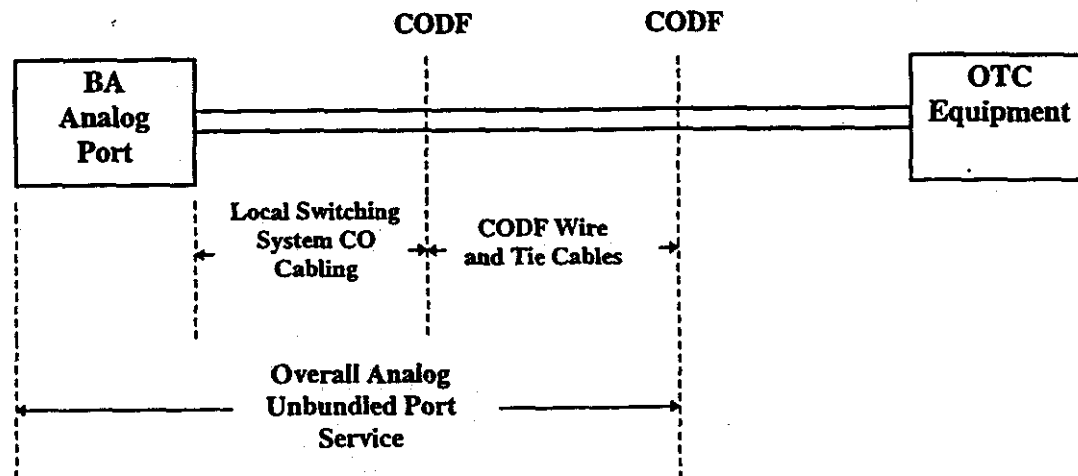


Figure 2-2. Unbundled Port Service Elements

2.08 The requirements for the BA unbundled port service elements are provided in Section 3 of this technical reference. The overall service requirements are specified in Section 4. Section 5 provides OTC equipment and cabling specifications. Figure 2-3 shows the requirements associated with unbundled port services.

2.09 The Basic line-side port is suitable for single line residential or business service. Unless the OTC requests ground-start supervisory signaling or DP address signaling at the time the service is ordered, the Basic port will be provided with loop-start supervisory signaling and DTMF address signaling capabilities. DP address signaling can be used on a port that is arranged for DTMF signaling.

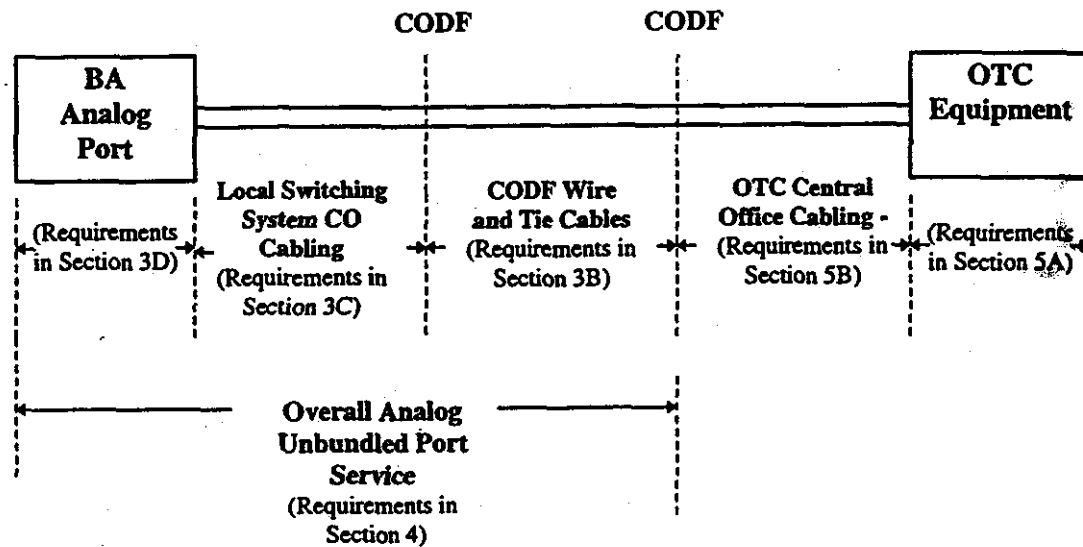


Figure 2-3. Requirements Associated with Analog Unbundled Port Services

2.10 The Centrex port is suitable for Centrex line service. Unless the OTC requests ground-start supervisory signaling or DP address signaling at the time the port is ordered, the Centrex port will be provided with loop-start supervisory signaling and DTMF address signaling capabilities. DP address signaling can be used on a port that is arranged for DTMF signaling.

2.11 The PBX port is suitable for Private Branch Exchange (PBX) Central Office trunks. Unless the OTC requests loop-start supervisory signaling or DP address signaling at the time the port is ordered, the PBX port will be provided with ground-start supervisory signaling and DTMF address signaling. DP address signaling can be used on a port that is arranged for DTMF signaling.

2.12 The DID port is suitable for one-way Direct Inward Dialing (DID) trunks. Loop reverse battery is the only supervisory signaling available. Unless the OTC requests DTMF or MF address signaling at the time the port is ordered, the DID port will be provided with DP address signaling.

2.13 The following list of supplementary features are some of the features that are available on line-side ports where technically feasible. Detailed feature lists by switch port type will be provided by the product manager.

- Additional listings
- Operator services
- Directory assistance
- Call Blocking (customer or OTC activated)
- Caller ID (calling number delivery)
- Speed calling

- 3-Way calling
- Call Waiting
- Call Forwarding (including Call Forwarding Busy and No Answer)
- Early fraud warning
- Hunt group arrangements
- Usage recording and daily usage tapes indicating the to and from number and start and stop time by port
- Simplified Message Desk Interface data link
- Routing options

2.14 All analog UPS services use the SN network channel (NC) code. Additional NC option codes are shown in Figure 2-4.

2.15 Network Channel Interface (NCI) codes describe the type of OTC signaling. Valid analog NCI codes are shown in Figure 2-5.

2.16 Valid analog NC/NCI code combinations are shown in Figure 2-6.

Figure 2-4: UPS NC Codes

| NC Code | Character 3 | Character 4 |
|---------|-------------|---|
| SN | A (2-wire) | L (line-side port) T (trunk-side port) |

Figure 2-5: UPS NCI Codes (see note)

| NCI Code | Description |
|-----------|--|
| 02QC3.OOE | Loop-start signaling - Closed End |
| 02QC3.OOC | Ground-start signaling - Closed End |
| 02QC3.RVT | Loop Reverse-Battery Terminating Signaling |

Note: NCI codes describe the function performed by the connecting OTC equipment not the function of the unbundled port service. For example, an LSLS port performs the open end function of an access line and connecting OTC equipment performs the closed end function.

Figure 2-6: Valid analog UPS NC/NCI Code Combinations

| Unbundled Port Service | NC Code | NCI Code |
|------------------------|---------|-----------|
| LSLS | SNAL | 02QC3.OOE |
| GSLs | SNAL | 02QC3.OOC |
| LRTS | SNAT | 02QC3.RVT |

3. Service Elements

A. General

3.01 Three elements are always used with analog Unbundled Port Services. They are: Central Office Distributing Frame (CODF) wire and tie cable(s), BA local switching system CO cabling, and a BA local switching system port. The following sections contain the specifications for each of these elements.

B. CODF Wiring and Tie Cable(s)

3.02 CODF cross-connect wiring and tie cable(s) are used to link the CODF termination of OTC equipment to the CODF termination of the BA local switching system port.

3.03 The total combined length of all CODF cross-connect wiring and all CODF-to-CODF tie cables used for analog UPS should be less than 1500 feet.

3.04 The direct-current resistance of the CODF wiring and tie cable used for analog UPS should be less than 80 ohms. This is equal to 1500 or less feet of 24 gauge cable.

3.05 The 1kHz loss of the CODF wiring and tie cable used for UPS, when measured between 900 ohm impedances, should be less than .5 dB.

3.06 The C-message noise measured on the CODF wiring and tie cables used for analog UPS shall be 20 dBmC or less when measured between 900 ohm impedances..

C. Bell Atlantic Local Switching System CO Cabling

3.07 The voice grade CO cabling used to terminate BA Local Switching System ports on the CODF shall use twisted-pair conductors.

3.08 The type, gauge, and length of the BA CODF cabling shall be specified based on this specification and BA equipment vendor requirements. If the specifications in this document differ from the equipment manufacturers specifications, then the more stringent of the two shall be used.

3.09 The direct-current resistance of the CO cabling between the BA local switching system port and the CODF shall meet the CO cabling requirements in the Bellcore FR-TSY-000064 [1] (i.e., 23 ohms or less). This is equivalent to 275 feet or less of 26 gauge cable, 440 feet or less of 24 gauge cable, and 700 feet or less of 22 gauge cable.

3.10 The 1kHz loss of the CO cabling between the BA local switching system port and the CODF, when measured between 900 ohm impedances, shall be less than .15 dB.

3.11 The C-message noise measured on the CO cabling between the BA local switching system port and the CODF shall be 20 dBmC or less.

D. Local Switching System Analog Ports

3.12 Bell Atlantic currently offers three different local switching system analog ports. They are: (1) the loop-start line-side (LSLS) port, (2) the ground-start line-side (GSLs) port, and (3) the loop reverse-battery terminating (LRTS) trunk-side port.

3.13 The impedance of the local switching system analog port is based on the type of local switching system. Most BA local switching system ports have a nominal 900 ohms + 2.16uF impedance, however some switching system ports have a nominal impedance of 800 ohms in parallel with 0.05 uF and 100 ohms.

3.14 Line-side analog ports shall provide 20 mA or more of loop current when terminated by a direct-current resistance of between 430 ohms and 1730 ohms.

3.15 The C-message noise measured on the analog port shall be 20 dBmC or less.

3.16 The C-Notched noise measured on the analog port shall be 45 dBmC or less with a -13 dBm0 1004 Hz holding tone.

3.17 Signaling on the LSLS (02QC3.OOE) and GSLs (02QC3.OOC) ports shall conform to the network specifications in ANSI T1.401-1993 [2].

3.18 Signaling on the LRTS (02QC3.RVT) port shall conform to the network specifications in ANSI T1.405-1996 [3].

4. Service Specifications

4.01 The overall end-to-end analog UPS service is from the CODF termination of the OTC equipment (OTC-POT) to the BA local switching system port (See Figure 2-1).

4.02 Analog UPS should meet the limits in Figure 4-1, 4-2, and 4-3 when measured at the BA local switching system test position. Parameters are usually tested in response to trouble reports or when additional testing is purchased.

Figure 4-1: Analog UPS Acceptance Limits (AL) and Immediate Action Limits (IAL)

| Parameter | AL | IAL |
|--------------------------|------------|------------|
| Loss | < 1.0 dB | > 1.5 dB |
| Resistance | < 100 ohms | > 100 ohms |
| C-Message Noise | < 30 dBmC0 | > 30 dBmC0 |
| LSLS & GSLs Loop Current | > 20 mA | < 20 mA |

4.03 Signaling on the LSLS (02QC3.OOE) and GSLS (02QC3.OOC) ports shall conform to the network specifications in ANSI T1.401-1993 [2]. Signaling on the LRTS (02QC3.RVT) port shall conform to the network specifications in ANSI T1.405-1996 [3].

4.04 Compatible TLP ranges are shown in Figures 4-2 and 4-3.

Figure 4-2: Compatible TLP Ranges at the OTC-POT

| Specified NCI Code | OTC Transmit TLP ¹ | OTC Receive TLP ² |
|----------------------|-------------------------------|------------------------------|
| 02QC3.OOE, 02QC3.OOC | 0.0 to -8.0 [0.0] | 0.0 to -1.0 |
| 02QC3.RVT | -2 to -3.5 [-3.5] | 0.0 to -1.0 |

Figure 4-3: Compatible TLP Ranges at the BA Local Switching System

| Specified NCI Code | BA Transmit TLP | BA Receive TLP |
|----------------------|-----------------|-----------------------|
| 02QC3.OOE, 02QC3.OOC | 0.0 | 0.0 to -8.0 |
| 02QC3.RVT | 0.0 | -2 to -4 ³ |

5. OTC Equipment and CO Cabling Requirements

A. OTC Equipment Requirements

5.01 Collocated OTC equipment used for interconnection with analog UPS shall meet all of the applicable generic equipment requirements in GR-63-CORE [4] and GR-1089-CORE [5].

5.02 Collocated OTC equipment shall be manufactured in accordance with FCC, NEC, UL, and USDL requirements and orders applicable to Federal, State, and local requirements including, but not limited to, statutes, rules, regulations, orders, or ordinances, or otherwise imposed by law. Where requirements are not specified in this document, contractual technical requirements, or other applicable documents, the manufacturer's requirements consistent with industry standards shall be met.

¹ The OTC transmit TLP is normally specified by the OTC. When the OTC transmit TLP is not specified, the bracketed [] value denotes the default TLP.

² The OTC receive TLP will be a function of the BA transmit TLP (0.0) and the total loss of the BA port, BA CO cabling, and BA CODF wiring. The average OTC receive TLP is -0.5 dBm and the level cannot be adjusted.

³ When the LRTS port is an analog trunk circuit, the BA receive TLP will be a function of the OTC transmit TLP and the total loss of the BA CO cabling, the BA CODF wiring, and the BA LRTS port. The average total loss of the BA CO cabling, BA CODF wiring, and BA port is about 0.5 dB and the BA receive TLP cannot be adjusted by BA. When the LRTS port is on a channel bank that has a high capacity connection to the BA Local Switching System, the BA receive TLP is obtained by Local Switching System translations and is always -4.0.

5.03 The open circuit tip-to-ring dc voltage that collocated OTC equipment applies to BA VF cabling shall be less than 80 Vdc.

5.04 Collocated OTC equipment shall not deliver more than 2.5 watts of power to any load via BA VF cable.

5.05 Collocated OTC load equipment shall not draw more than 100 mA of loop current from LSLS and GSTS ports and shall not deliver more than 100mA of loop current to any LRTS port.

5.06 The noise limits for analog UPS are predicated on the OTC equipment having a longitudinal balance of > 60 dB when measured using the methods and equipment specified in ANSI/IEEE 455-1984 [6].

5.07 The loss and noise limits for analog UPS are predicated on collocated OTC equipment having a nominal impedance of 900 ohms when measured using the methods and equipment in ANSI/IEEE 743-1995 [7].

5.08 The applied power level of any transmitted signal averaged over 3 seconds shall not exceed -12 dBm0.

5.09 The signaling characteristics of OTC equipment associated with LSLS and GSLS ports shall conform to the loop-start and ground-start customer installation specifications in ANSI T1.401-1993 [2].

5.10 The signaling characteristics of OTC equipment associated with LRTS ports shall conform to the loop reverse battery customer installation specifications in ANSI T1.405-1996 [3].

B. OTC CO Cabling Requirements

5.11 The voice grade CO cabling used to terminate OTC equipment on the CODF for interconnection with analog UPS shall use twisted-pair conductors.

5.12 The type, gauge, and length of the OTC CODF cabling shall be specified based on this specification and OTC equipment requirements. If the specifications in this document differ from the OTC equipment manufacturers specifications, then the more stringent of the two shall be used.

5.13 The direct-current resistance of the CO cabling between the OTC equipment and the CODF shall meet the CO cabling requirements in the Bellcore FR-TSY-000064 [1] (i.e., 23 ohms or less). This is equivalent to 275 feet or less of 26 gauge cable, 440 feet or less of 24 gauge cable, and 700 feet or less of 22 gauge cable.

5.14 All CO cabling between OTC equipment and the CODF shall be equipped with connectors at each end. The type of connectors shall be specified by the CO Engineer.

5.15 The 1kHz loss of the CO cabling between the OTC equipment and the CODF, when measured between 900 ohm impedances using the methods and equipment specified in ANSI/IEEE 743-1995 [7], shall be less than .15 dB.

5.16 The C-message noise measured on the CO cabling between the OTC equipment and the CODF, when measured between 900 ohm impedances using the methods and equipment specified in ANSI/IEEE 743-1995 [7], shall be 20 dBmC or less.

6. References

A. Definitions

Central Office (CO)

A telephone company building which houses equipment and facilities used to provide switched access services.

Central Office Distributing Frame (CODF)

Framework located in a CO that holds wire cross-connects which are used to interconnect cable terminations for end-user customer loops, switching system ports, and inter-office facilities.

Closed end

The closed end of an access line is the end of the access line that is not switched. The closed end connects to CPE or OTC equipment that functions as terminal equipment.

C-Message Noise

The frequency-weighted, short-term average noise within an idle channel. The frequency weighting, called C-message, is used to account for the variations in 500-type telephone set transducer efficiency and end-user annoyance to tones as a function of frequency.

C-Notched Noise

The C-message frequency-weighted noise on a channel with a holding tone that is removed at the measuring end through a notch (very narrow band) filter.

dBm

A unit for expression of power level in decibels relative to one milliwatt.

dBm0

Power level referred to, or measured at, a zero transmission level point (OTLP).

dBm

A unit used to express noise power relative to one picowatt (-90 dBm).

dBmC

Noise power measured with C-message weighting expressed in dBm.

dBrnC0

Noise power in dBrnC referred to, or measured at, a zero transmission level point (0TLP).

Decibel (dB)

The logarithmic unit of signal power ratio most commonly used in telephony. It is used to express the relationship between two signal powers, usually between two acoustic, electric, or optical signals; it is equal to ten times the common logarithm of the ratio of the two signal powers.

Dial Pulse (DP)

A type of switched access line address signaling that uses rapid loop open and loop closure signals (pulses) to indicate the digit being dialed. The digits 1 through 9 are represented by the same number of pulses and the digit zero is represented by ten pulses.

Dual Tone Multi-Frequency (DTMF)

A type of switched access line address signaling that uses two tones transmitted simultaneously to indicate a digit (0 to 9) or character (* or #).

Ground-Start (GS) signaling

A type of switched access line supervisory signaling in which the network provides a battery source. To initiate a call, CPE or OTC equipment provides a ground on the ring lead. The ring ground causes dc current to flow which the local switching system will detect as a request for service. On terminating calls, CPE or OTC equipment will provide an off-hook loop closure that is recognized as an answer signal.

Line-side

That part of a local switching system that interfaces access lines.

Local switching system

A system that establishes connections between access lines and connections between access lines and interoffice trunks. Access line ports are located on the line-side of the local switching system and trunk ports are located on the trunk-side of the local switching system.

Loop reverse-battery signaling

A type of switched access line supervisory signaling that uses loop-open and loop-closure signals to indicate on-hook and off-hook signals in one direction and normal battery polarity and reverse battery polarity to indicate on-hook and off-hook signals in the other direction. The end of the service that generates loop open and loop closure signals is called the originating end and the other end which generates the normal battery polarity and reverse battery polarity signals is called the terminating end. For LRTS and other DID-type ports, the local switching system is the originating end and the CPE or OTC equipment is the terminating end. The interface code for such applications represents the function performed by the CPE or OTC equipment (02QC3-RVT).

Loop-Start (LS) signaling

A type of switched access line signaling in which the network provides a battery source. To initiate and maintain a call, CPE or OTC equipment will provide an off-hook loop closure. The loop

closure causes dc loop current to flow which the local switching system will recognize as a service request. On terminating calls, CPE or OTC equipment will provide an off-hook loop closure that is recognized as an answer signal.

Open end

The open end of an access line is the end of the access line that connects to the local switching system port. The open end can be switched to other line or trunk ports associated with the same local switching system.

Other Telephone Company (OTC)

An organization that provides telecommunications services to the public.

Trunk-side

That part of a local switching system that interfaces interoffice trunks.

Unbundled Port

A physical termination (port) on a switching system that provides access to and from the public switched telephone network.

Voice Grade (VG)

A term used to describe a channel, circuit, facility, or service that is suitable for the transmission of speech, digital or analog data, or facsimile, generally with a frequency range of about 300 to 3000 Hz.

B. Acronyms

| | |
|------|---|
| AL | acceptance limit |
| ANSI | American National Standards Institute |
| BA | Bell Atlantic |
| CO | central office |
| CODF | central office distributing frame |
| CPE | customer premises equipment |
| DID | Direct Inward Dialing |
| DP | dial pulse |
| DS1 | digital signal level one |
| DTMF | dual tone multi-frequency |
| GS | ground-start |
| GSLs | ground-start line-side |
| FCC | Federal Communications Commission |
| IAL | immediate action limit |
| IEEE | International Electrical and Electronic Engineers |
| LRB | loop reverse-battery |
| LRTS | loop reverse-battery trunk-side |
| LS | loop-start |
| LSLS | loop-start line-side |

| | |
|------|---|
| NC | network channel |
| NCI | network channel interface |
| NEC | National Electric Code |
| OTC | Other Telephone Company |
| PBX | Private Branch Exchange |
| PIC1 | primary interconnect carrier one |
| PIC2 | primary interconnect carrier two |
| POTS | plain ordinary (analog) telephone service |
| UL | Underwriter's Laboratory |
| UPS | Unbundled Port Service |
| USDL | United States Department of Labor |
| USOC | Universal Service Order Code |
| VF | voice frequency |
| VG | voice grade |

7. Bibliography

- 1- Technical Reference FR-NWT-000064, LATA Switching Systems Generic Requirements (LSSGR), (Bellcore, 1994).
- 2- American National Standard for Telecommunications - Interface Between Carriers and Customer Installations - Analog Voicegrade Switched Access Lines Using Loop-Start and Ground-Start Signaling, ANSI T1.401-1993.
- 3- American National Standard for Telecommunications - Network-to-Customer Installation Interfaces - Direct-Inward-Dialing Analog Voice grade Switched Access Using Loop Reverse-Battery Signaling, ANSI T1.405-1996.
- 4- Generic Requirements GR-63-CORE, Network Equipment-Building System (NEBS) Requirements: Physical Protection, Issue 1, (Bellcore, October 1995).
- 5- Generic Requirements GR-1089-CORE, Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment, Issue 2 (Bellcore, November 1994).
- 6- ANSI/IEEE 455-1984 (R1993), Test Procedure for Measuring Longitudinal Balance of Telephone Equipment Operating in the Voice Band.
- 7- ANSI/IEEE 743- 1995, Standard Methods and Equipment for Measuring the Transmission Characteristics of Analog Voice Frequency Circuits.

NOTE: These documents are subject to change; references reflect the most current information available at the time of printing. Readers are advised to check the status and availability of all documents.